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PSYCHE

VOL. XXIII JUNE, 1916 No. 3

NEW SPECIES OF ASILIDÆ FROM SOUTHERN CALIFORNIA.[1]

By Frank R. Cole,
Scientific Assistant, Bureau of Entomology, U. S. Department of Agriculture.

The species described in this article were all collected in San Bernardino County, California. There are many asilids in this region, and no great amount of collecting has been done since Coquillett worked over this section. Any extensive collecting is certain to bring to light new forms. In traveling only a short distance here, one will encounter a great variety of ecological conditions. There are many flowers at all seasons of the year and the mild climate permits of almost uninterrupted collecting. In the preparation of this paper the writer is indebted to Mr. Frederick Knab for the use of the National Museum collection, which contains much valuable type material in this group.

Cophura highlandica sp. nov. (Plate VIII, fig. 4).

♀. Length, 7 mm. Head yellowish gray pruinose. Body black, mostly hidden by pollen. Front yellowish gray pollinose. Face gently convex. Mystax white and extending nearly to the antennæ. First joint of antenna slightly longer and more slender than second. Third joint four times as long as second, and slender. Style not very slender, rounded at end. Thorax gray and light brown pruinose. Two dark brown vittæ, broad in front and narrowed behind. Thorax very convex. A shining black spot above supra-alar groove and two of the same size just in front of scutellum. Bristles of thorax black. Fan-like row of bristles in front of halteres yellowish. Two large bristles on margin of scutellum near center, and two small ones outside of these. Abdomen shining black marked with yellowish gray pollen. Pile of thoracic dorsum very sparse. Pile of legs white, the bristles pale yellow and white. The pollinose bands on abdomen on each side reaching the posterior margin at sides. A black polished spot in center of each lateral patch of pollen. Tarsi black. Bases of tarsi, the tibiæ, and tips of femoræ reddish brown. Wings yellowish hyaline, the extreme apex brownish. Light clouds on veins at bases of discal, submarginal and posterior cells.

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Type—U. S. N. M., Cat. No. 20185. One specimen.

Habitat—East Highlands, Cal., Nov. 25, 1914.

Lestomyia redlandæ sp. nov. (Plate VII, fig. 2).

♂. Length, 9 mm. General color blackish. Face and front black. Yellow pollen on face and along oral margin. Antennal triangle black, semi-shining. Mystax white (mostly broken off in this specimen). Scant pile on front near eyes. Two black bristles on underside of second antennal joint. Antennæ black with cylindrical arista which is more than twice as long as wide. The third segment of antennæ begins to widen some distance from base. Occipito-orbital bristles whitish. No markings on dorsum of thorax, which is pollinose. Thoracic bristles black and strong. Scutellum with six strong upcurved bristles on margin. There are three bristles on each side and they converge and cross each other. Halteres yellow. The fan-like row of bristles before the halteres is yellowish. Abdomen dark gray pruinose. There is a shining black spot on each side of second, third, fourth, fifth and sixth segments. Short recumbent white pile on dorsum of abdomen. Hypopygium brownish red, base shining black. Narrow rim on posterior margin of each abdominal segment a dull reddish color. Legs red. Some red color on coxæ. Black ring on all femoræ, broader on the hind ones. Tibiæ black except base. Spines on legs mixed black and white. Wings hyaline.

Type—U. S. N. M., Cat. No. 20186. Single specimen.

Habitat—Redlands, Cal., 1913.

Lasiopogon drabicolum sp. nov. (Plate VIII, fig. 3).

♂, ♀. Length, 8–9 mm. Ground color black. Densely gray pollinose. The pollen of head and thorax with a yellowish tinge. A great deal of white pile on the body. Ocellar bristles black and white mixed and very slender. Occipito orbitals black. One black bristle above on second joint of antenna. The rest of the antennal bristles fine and white in color. Two very faint brown stripes on thoracic dorsum of ♀. Two dark brown widely separated stripes on thorax of ♂, wide at the shoulders and narrowing toward the center of the dorsum where it disappears. Pile of palpi white. In both ♂ and ♀ the pile of front is white and black mixed. Short white pile on thorax. Abdomen covered with short whitish oppressed pile, longer at lateral margins. The mystax black and white and quite heavy. Eighth abdominal segment of ♀ polished black. A circlet of black bristles on genitalia. Scutellum flat, with a semi-circular impressed line as in *arenicola*. Several spines on margin of scutellum, the stronger ones long, black and upcurving. Hypopygium black, slightly pollinose, and covered with white pile and black hair. Legs black, gray pollinose, with white pile and slender black bristles. Tarsi of ♂ dark reddish brown almost black in front. Tarsi of ♀ blackish. Wings grayish hyaline with brownish black veins. Venation normal, the anal cell closed. Anterior crossvein not much before middle of discal cell. In these specimens all the posterior cells wide open.

Type—U. S. N. M., Cat. No. 20183. One male and one female specimen.

Habitat—Redlands, Cal., 1913.

These small robberflies were collected on wild flowers, and one of them was observed capturing a small cecidomyiid.

Metapogon pictum sp. nov. (Plate IX, fig. 5).

♂. Length, 7 mm. General color black. First two segments of antennæ black, gray pruinose. Thorax grayish pollinose, the vittæ brown in color and coalescing. The brown markings vary in different specimens. Some of the spots are golden brown in color. In some specimens the brown markings do not extend to the scutellum. Border of scutellum gray pruinose, yellowish in center. Abdomen yellowish gray pruinose, hind margins of all except last segment polished black, the last three narrowly. Anterior third of second segment polished black. Second, third, fourth, fifth, and sixth segments with a black spot on each side. The gray pruinose fasciæ on all the segments vary in size and shape, in all but the last segment running almost to the median line. The gray pruinose spots on the seventh segment are confined to the lateral margin. Meso, sterno, and pteropleuræ bare, and gray pruinose with golden brown spots. Scutellum rounded and with a subapical pair of stout bristles. Femora black, the tips of the middle and hind ones being gray pruinose in front. Knees dark reddish brown. Tibiæ and tarsi dark reddish brown. Legs very much darker beneath. White hairs on legs quite thick, the bristles strong and either brown or white. Halteres grayish brown, lighter at tip and base. Supra-alars reddish yellow, the rest of the thoracic bristles black. Antennal style about one third as long as third joint. Mystax mixed yellow and white. In two specimens the front pair of dorso centrals are partly reddish. Wings hyaline. Broad brown spots at base of discal, posterior and submarginal cells. Tip of wing brown. Genitalia polished black.

Type—U. S. N. M., Cat. No. 20184. Several paratypes in author's collection.

Habitat—East Highlands, Cal., February, 1915.

This species is quite close to *punctipennis* Coq., but the markings differ, and the spots of the wing are darker and more distinct. In *punctipennis* the tip of the wing is hyaline, and the base of the marginal cell has no brown color. The thoracic and scutellar bristles of *pictum* are black, those of *punctipennis* are yellowish. The tarsi of *pictum* are darker, and the knees black. In *punctipennis* the knees are red and the gray pruinose fasciæ on the abdomen are broader. A number of specimens of this new species were collected, most of the material being in the author's collection in California and not available for study. These small flies were collected on the dead twigs of sage brush (*Salvia mellifera*) and the wild alfalfa (*Lotus glaber*) so common in Southern California, and are not very quick on the wing.

Lestomyia montis sp. nov. (Plate IX, fig. 6).

♀. Length, 9 mm. Black or blackish in general color. Face black with white pollen on convexity. Mystax white. A black bristle on each side just above oral margin. Tuft of six black ocellar bristles. Yellowish white pile on each side of front. Antennæ black, gray pollinose. Four indistinct blackish stripes on dorsum of thorax. Gray and yellow pollen on thoracic dorsum. Fan-like row of bristles before halteres yellowish. Halteres yellowish. Abdomen black, gray pollinose. Black polished spot on each side of second, third, fourth, and fifth segments. Genitalia and most of sixth and seventh segments shining. Femora black. Tarsi brown. Femora red at tip and with a tinge of dark red color at base. Base and distal end of tibiæ black. Bristles on legs black. White bristles on coxæ. Thoracic bristles black and very long. Wings yellowish hyaline.

Type—U. S. N. M., Cat. No. 20187. One specimen.

Habitat—Bear Valley, Cal., June, 1913. Collected at an altitude of about 8,000 feet.

This species differs from *fraudiger* in the third joint of the antenna being more rounded. The front femora are black at the base.

Nicoces lomæ sp. nov. (Plate VII, fig. 1).

♂. Length, 11 mm. Ground color of thorax dark brown and black, thickly pollinose. Dorsum of thorax black, with a median narrow wedge of silvery pollen running to center of dorsum. Silvery pollen on sides of thorax just above dorso pleural suture and on pleuræ. Brown pollen on pleuræ and in front of scutellum. All abdominal segments shining yellowish red. The posterior margin of second segment of abdomen has a small lateral projection which is silvery pollinose above. Base of second segment shining black, and the narrow lateral margin darkened. Fifth abdominal segment not more than three times broader than long. Yellowish and silvery pollen on coxæ. Fifth and sixth segments bright silvery pollinose. Fourth segment slightly narrower than fifth. Abdomen with recumbent reddish yellow hair. Hypopygium small in type specimen. Face easily one-fourth entire width of head. Inner margin of eyes slightly converging near antennæ. Face and front flat and thickly brown and silvery gray pollinose. Two rows of long reddish brown bristles on oral margin, a few long white hairs above, extending to antennæ. Ocellar bristles brown. Cilia of posterior orbit brown. Antennæ black, gray pruinose. First two joints of antennæ with brown bristles. One strong bristle beneath second joint. Third joint flat and slightly longer than first two joints together. Style rather slender acuminate, and less than half as long as third segment. Post-alars and supra-alars quite long and brown in color. White pile on scutellum and just in front of. Legs medium slender, rounded. Tibiæ and tarsi very spinose. Femora hairy. Hind metatarsi with many short strong spines beneath. Hind femora slender on basal two-thirds and with a club-like thickening toward the end. Hind tarsi thick and heavy. Metatarsus almost as long as three following joints. Legs reddish yellow, the tarsi dark brown distally. Front femora dark brown. Bristles of legs reddish yellow and pile white. Wings elongate and variegated with blackish brown, basal third being hyaline. Tip of anal cell blackish, posterior cells in part blackish. Fifth posterior cell all black. Hyaline spot in marginal cell. Discal cell all dark.

Type—U. S. N. M., Cat. No. 20200.

Habitat—Redlands, Cal., April, 1914.

There are three paratypes in the U. S. N. M. collection. These are all males. Two are labeled "Los Angeles Co., Cal., Coquillett," and in these the abdomen is more of a reddish color than in the type. The other specimen is labeled "September, Los Angeles Co., Cal." and is smaller and lighter in color than the others, the abdomen being yellow. These specimens are probably faded to some extent but agree very well with the type. As in the described specimen the venter is brown with silvery pollinose areas, and is thickly dotted with small dark brown spots. The wings are marked as in the type but are more of a brownish color. The type was taken on a sandy plot of ground in the foothills south of Redlands, Cal.

This species is quite close to *abdominalis*, but does not have the tinge of red on the thorax. The last segment of the abdomen is narrower, and the bluish black color of the abdomen is confined to the base of the first and second segments. In *lomæ* the brown of the wings is cut off sharply and does not spread into the basal

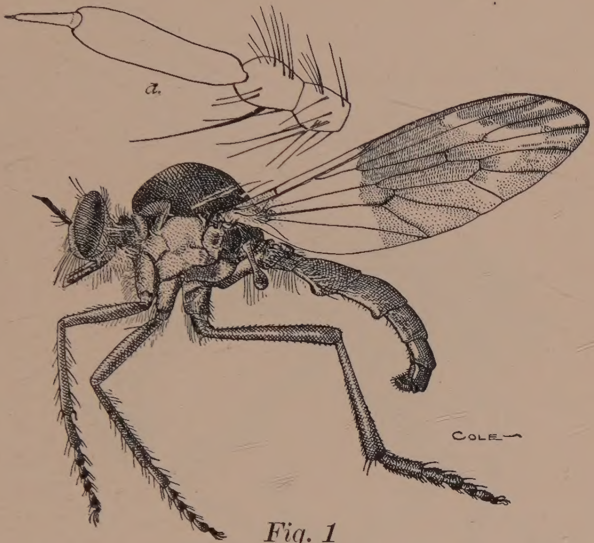

Fig. 1

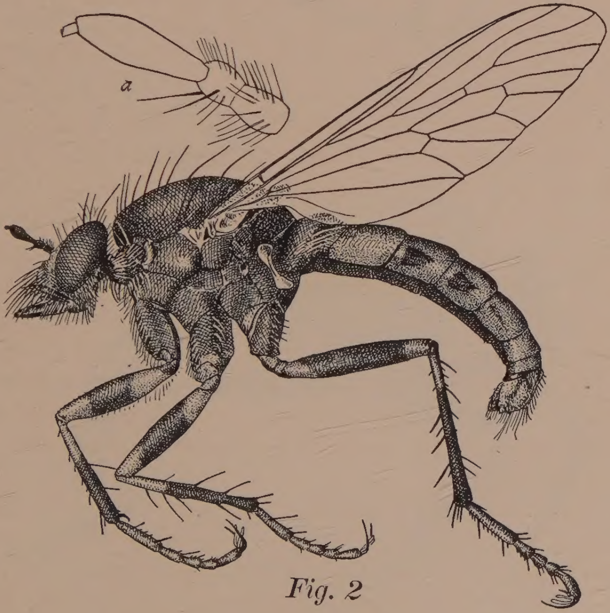

Fig. 2

COLE—*New Asilidæ.*

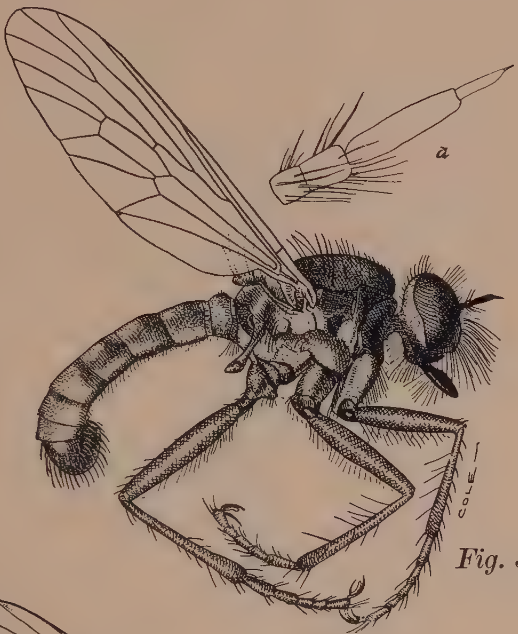

Fig. 3

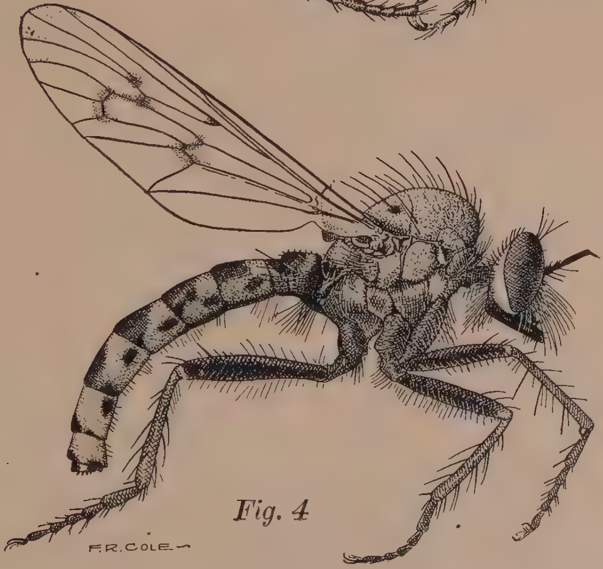

Fig. 4

COLE—*New Asilidæ.*

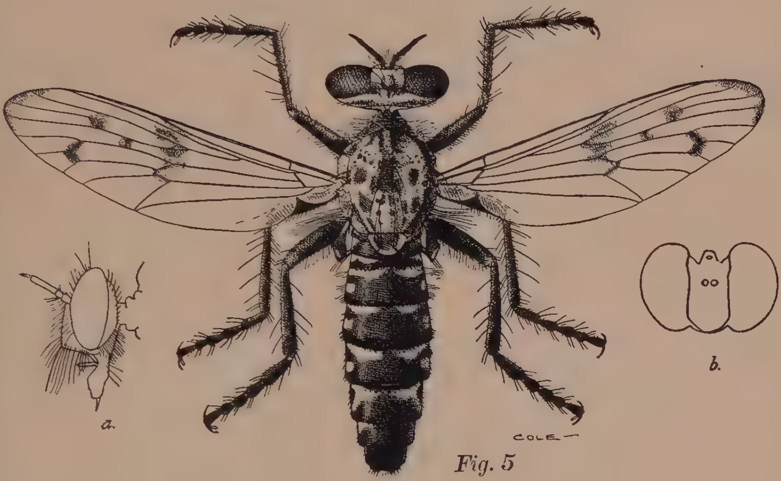

Fig. 5

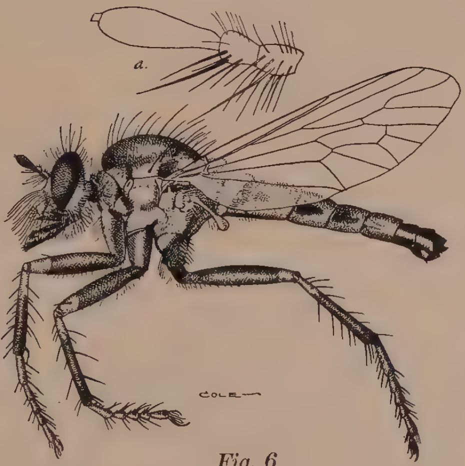

Fig. 6

Cole—*New Asilidæ.*

part of the wing. The arista of the antenna is more slender and sharper at the tip. The thoracic dorsum is dull and pollinose in the new species and shining in *abdominalis*.

Explanation of Plates

Plate VII.

Fig. 1. *Nicocles lomæ* sp. nov.
  a. Antenna, greatly enlarged.
Fig. 2. *Lestomyia redlandæ* sp. nov.
  a. Antenna, greatly enlarged.

Plate VIII.

Fig. 3. *Lasiopogon drabicolum* sp. nov.
  a. Antenna, greatly enlarged.
Fig. 4. *Cophura highlandica* sp. nov.

Plate IX.

Fig. 5. *Metapogon pictum* sp. nov.
  a. Head from side.
  b. Outline of head from front.
Fig. 6. *Lestomyia montis* sp. nov.
  a. Antenna, greatly enlarged.

PLASTER-CASTING INSECT BURROWS.

By R. P. Dow,
New York City.

During my visits to J. Turner Brakeley, the hermit naturalist of Lahaway, N. J., we devoted much time to making plaster casts of burrows in the soil. Occasionally we tried the hole made by a snake, rat or even chipmunk, but for the most part our efforts were entomological. Great bare patches of sandy ground were, *par excellence*, insect homes. One hillside patch was the favorite haunt of Myrmeleon larvæ, their traps pitting every square foot of surface. The larvæ of Cicindela avoided such places, perhaps lest overpopulation should spell starvation. They had haunts of their own, some species, notably *C. lepida*, preferring absolutely bare white sand, others, *modesta consentanea, generosa,* liking a surface sparsely covered with pine needles with slight growth of weedy grass. Almost all species are fond of the ruts in the woodpaths seldom rendered dangerous by passing tires or human feet. The "pepo" spiders were omnipresent, although seeking a space perfectly clear for at least a few inches adjacent to the burrow mouth. The various species of wild bees have a habitat of their own, on sloping land where the trees are sparse enough to admit sunlight and where the clay subsoil is confined many feet below the surface. Ant burrows were, of course, abundant and ubiquitous. Here and there, too, were many burrows of whose architects we never learned.

All methods of studying insects underground have their limitations, even their failures. On the whole, as satisfactory as any, has been the plaster cast. This was Mr. Brakeley's own invention and a matter of great pride to him. It has already (a score of years ago) been described in scientific literature, but is seldom practised, for although collectors are numerous, observers of nature are still rare. Besides, it sometimes calls for much labor and always for great delicacy of touch. The *Cicindela* burrow, from six to fourteen inches deep, presents no great task, but that of a *Colletes* bee, extending sometimes seven feet vertically, is a different matter. The late John B. Smith, for twenty-eight years a welcome and frequent visitor at Lahaway, dug out one or two, but for the most part he poured the plaster and sat smoking a cigar allowing the hermit to wield the spade until the pit resembled a small cellar. It was easy for me to do the same. In the first place Mr. Brakeley pronounced me an awkward bumpkin almost certain to smash the cast, and secondly he claimed to be fond of the exercise which kept his muscles limber.

The method in brief: equal volumes of water and plaster of Paris are mixed quickly in a pitcher. If salt water were used the plaster would "set" so quickly that it could not be poured. It has been suggested that by mixing a couple of tablespoonfuls of liquid glue with the water setting is retarded and the cast is stronger. Even at best the mixture must be poured quickly with unshaking hand, since it becomes too hard for use in less than twenty seconds. Three ounces of mixture will fill any *Cicindela* burrow. About four and one-half are needed for a "pepo" spider. A *Colletes* requires seven to nine ounces, the pouring of which renders the delay of a second dangerous. If one would like to essay a nest of *Formica exsectoides* from which, say, three bushels of earth had been thrown out, it would take about ninety-six pounds of plaster solution. This is only practicable by mixing, say, eight ounces at a time and making nearly 200 separate pourings, trying each surface hole before pouring the second installment into the same hole. Thus the lowest levels would be filled and later superpositions become easier. The smaller species of ants can often be treated with a few ounces of plaster, but great care must be taken as most of the galleries are nearly horizontal and the entrance so small that the thread-like stream of plaster lacks the weight to force its way through the laterals. In such cases, and in Cicindela burrows built on a sidehill with horizontal entrance, I have succeeded by taking a wide bottomed paper cone into which a considerable weight of plaster furnished by gravity the force necessary to fill not only laterals on the level but even those which rise several inches.

A great obstacle to success is the resistance of the inhabitant. The body of the "pepo" is almost as large as the neck of its hole (Fig. 11).[1] When she perceives the stream of plaster coming she opposes her body to it, with the result that the plaster falls on all sides of her insufficiently liquid to rejoin, and thus the cast is almost always hollow, the victim either escaping or being buried near the neck. If there are young in the burrow she resists to the death. Everything in the burrow is caught in the surface of the plaster. The Cicindela larva opposes its chitinized head to the plaster flow in the same manner and often blocks it completely. In such case the luckless one is hauled up with head imbedded in solidified plaster, to be killed as an act of mercy. If the cast be wholly successful the larva is either forced to the bottom or remains imbedded in it, leaving the cast hollow beneath it.

Often there adheres to the bottom an oval film, not of spun silk nor discarded larval skin. I presume that this is the covering of a pupa of a parasite and that the pupa of the beetle is naked. Mr. Brakeley bred out some parasites, but he sent them, as was his custom, to some scientist and never got back either specimen or name.

Ants do not make the same sort of resistance. Those which do not escape via some other gallery are imbedded in the surface of the plaster with the eggs, grubs, inquilines and every other inhabitant of the nest. They do, however, gather to protect their queens. I have had nests in which queens were caught by the legs and their protectors kept the plaster from covering them. One such lay on my table for a month. Three surviving ants watched over the queen. I furnished food, so that it is probable that they died of old age, rather than starvation.

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[1] All figures are reduced about one third from natural size.

So much for the easy part, the pouring of the plaster. The novice, too eager to see his results, digs out the cast on the same day, and the wet plaster, still soft, breaks into a hundred pieces. The best way is to make a cast one week end and dig it out the next. Then you have a chance of getting your cast home.

The digging out requires first that a pit be dug alongside not closer than a foot from the vertical, otherwise the spade may strike the tube. This must be deeper than the estimated depth of the whole tube. An ordinary table knife is the next useful implement. Beginning near the bottom the earth must be dissected away, never roughly or hastily, until the plaster tube is detected. Then a still more delicate knife, or spatula, comes into play. The cast must be wholly freed from the bottom first. If near the top, it will surely fall and break. It is a veritable triumph, causing feelings of hilarious elation, to detect the bottom of a bee burrow and progress until all the clay cells containing the grubs, etc., are fully exposed for half their circumference, and then to uncover the tube, about as thick as a lead pencil and extending, may be, five feet without a branch.

There are no especial seasons for making casts. Burrows are clean mouthed and inhabited from early spring until frost time. It is well, however, to choose burrows which show fresh earth around them. After every rain the occupant has to clean house, and the result invariably shows. Surface sand burns white. At a depth of six inches it is almost always colored yellow by iron oxides. The yellow upcasts betray the situation. The bees are especially vexatious. The female often digs a score of holes before adopting one permanently. I have watched a species of gray bee flitting and lighting for hours. She kicked away soil with hind legs with marvelous rapidity, until in fewer than twenty seconds she would be entirely out of sight. If she encountered a pebble she abandoned the hole, or backed out with pebble held by her four hind legs, locomoting with the forward pair. She abandoned hole after hole without visible reason. I once filled sixty such burrows without finding one unabandoned. In this case, as the soil was "made" on the seashore by a sand pump, fresh diggings could not be distinguished.

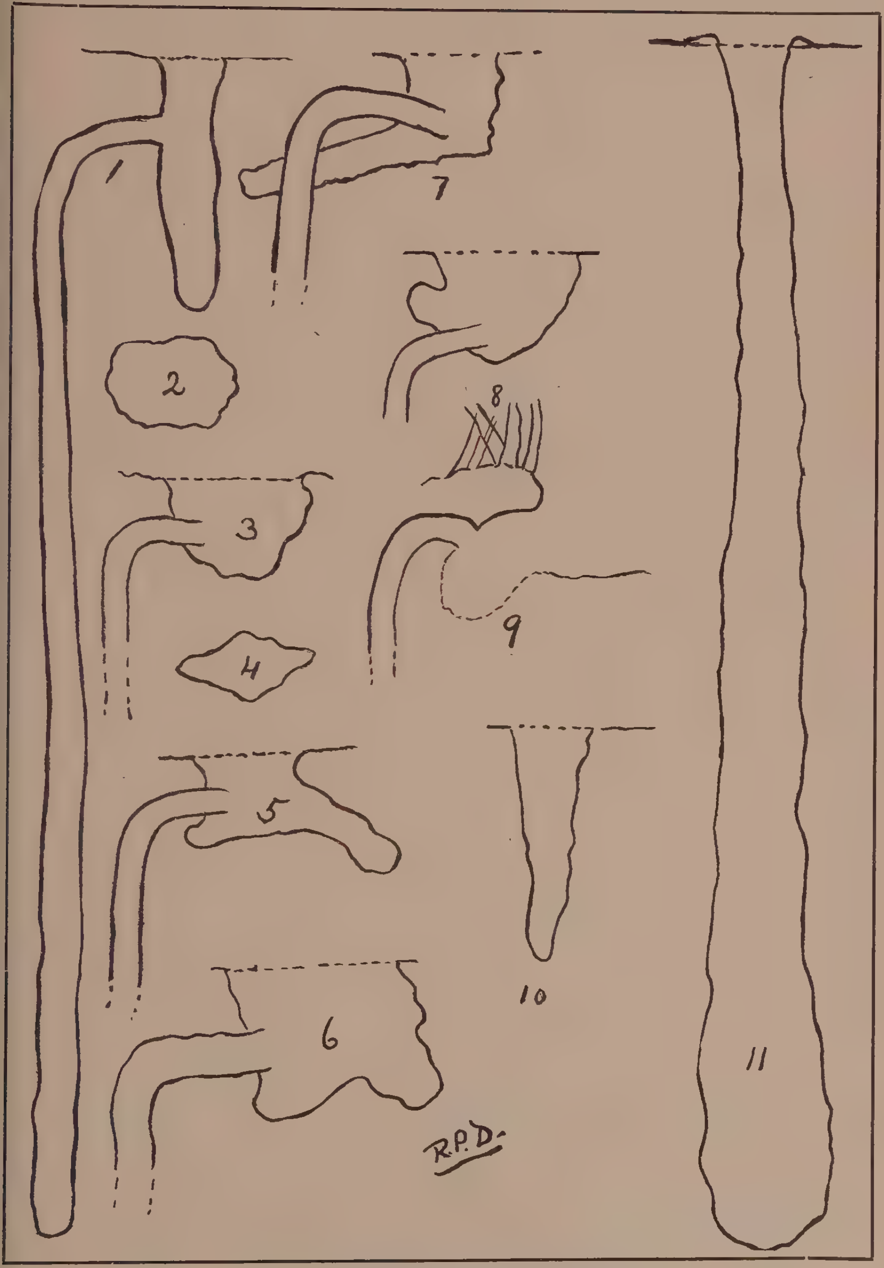
But, for the present, the matter under consideration relates to *Cicindela*. The illustrations are crudely drawn from actual casts and the identification of species is made *from a similar burrow.* This is accomplished by putting a wire net over a burrow during pupal season and catching a freshly hatched adult. The task is not easy in case of the supposedly two brooded species. Many, perhaps most, of these live in the larval state into the second year. Of *C. lepida* I can be certain, for I have watched them in a territory of my own discovery on Brakeley land. Mr. Brakeley had previously taken a few specimens over his 335 acres, and I found the colony, clustering around a spot where there were the remains of an Indian campfire on the dunes, and where I found also beautiful arrow and spear heads. *C. lepida* and the Delaware Indians camped on the same spot. On July 18, 1915, I saw *C. lepida* scampering by the thousands; their flight is very short, never over six feet, and they run more quickly than *dorsalis*. As I had no net (the mercury was 90° in the shade, and on this hot sand dune 130° or over) I took only a dozen with bare hand, stalking them on knees and the other hand. Their larval burrows could be seen by the thousands. The description given by Mr. Wenzel, quoted from J. B. Smith's list of the Insects of New Jersey, is correct so far as it goes. But the insect is scarce at Jamesburg and only burrows under grass tufts were found. The species does not choose such sites rather than another. The burrows were at least one per yard of dune and the number under grass tufts about in ratio with the area of grass tuft *vs.* clear open sand. The entrance hole has a characteristic shape, which, once seen, can never be mistaken.

Fig. 2 shows the shape of the surface aspect of most *Cicindela* burrows. Fig. 4 shows *C. lepida*. Fig. 5 is a cast of *C. lepida* burrow.

All *Cicindela* burrows that I have seen agree in general plan. They consist of a pit from which a long, slender tube extends, at first, not far from horizontal for a distance slightly shorter than the body of the larva. The insect lies habitually with its head at the opening of the tube and presumably with the abdominal hump catching at the corner. Its sensory organs are so keen that it retires into its tube before an observer can look in. After many minutes of quiet watching one may see it no longer alarmed, and back in place. The burrows exhibit three general types, each species never departing from its own. Fig. 1 is that of *C. punctulata*, the simple burrow, depending on its depth for victims. Apparently the larva has to leave its tube to devour its prey. Fig. 2 is the surface aspect, but applies equally to most other species, and is given here merely for contrast to the aspect of *C. lepida.* Fig. 10 is an enigma to me. It looks like a *C. punctulata* burrow without trace of a tube. I have burrows of young larvæ, in which the tube is scarcely 3–32 if an inch in diameter. It may not be argued that the burrow, Fig. 10, indicates that the trap is dug before the tube. On the contrary, the tube is dug and enlarged as the larva grows.

Figs. 3 and 8 are of the no-trap plan. One is typical of what I assume to be *C. modesta.* The other has a trap slanting upward, useless as a prey-catcher. I assume that this was made by the enforced removal of a pebble. Fig. 6 is the double-trap type, which I know to be characteristic of *C. tranquebarica.* Here the victim has the choice of two shallow pits to flounder in while the tiger leans out of its tube devouringly. The fourth type is the single-trap, the pit generally of some length and slanting not far from the horizontal. Fig. 5 is the typical *C. lepida* burrow on open sand. An insect having fallen therein would naturally run for safety into the *cul de sac.* Fig. 9 is a *C. lepida* burrow under a grass tuft. The *cul de sac* meets requirements of environment, but is much broader. Fig. 7 is an aberration or some species not identified. It was larger than and its surface different from that of *C. lepida.* I suspected *C. consentanea* from environment, but lack evidence. The *C. sexguttata* tribe does not generally burrow in open spaces.

Two common species, *C. rugifrons* and *C. dorsalis*, are still to be plaster-casted. I can safely predict that their burrows will be found to have specific distinctive characters. In fact, I may predict that every species of *Cicindela* can be differentiated by its larval burrow.



Dow—*Plaster Casts of Insect Burrows.*

SOME NEW ENGLAND SYRPHIDÆ.

By Charles W. Johnson,
Boston Society of Natural History.

Microdon tristis Loew.

The variations of this species are not clearly defined and it is difficult to separate them with the descriptions available. With a series of thirty-seven specimens before me they seem to be readily separated into two species by the form of the scutellum. In *M. tristis* the scutellum is rather plane or flattened and somewhat rugose, angulate and emarginate, with the spines at the extreme angles, the pile thin so that the outline of the scutellum can be seen distinctly.

The other form has the scutellum noticeably convex, the margin rounded and scarcely angulate, the small spines more approximate and hidden in the long dense pile. The tarsal joints are slightly more dilated and the abdomen of the females are as a rule much broader. For this species the name *M. cothurnatus* Bigot can be used, as I see no character to separate the eastern and western forms. Bigot's type was from Washington and specimens from Seattle agree with his description. It is more northern in its distribution than *M. tristis* although both are found in southern New England, northern New Jersey and Pennsylvania. Specimens before me show the following distribution: Capens, Moosehead Lake, Me., July 15; Bretton Woods, June 24, and Halfway House, Mt. Washington, N. H., July 6 (C. W. Johnson); Kearsarge, N. H., July 2, and West Chop, Mass., July 4 (A. P. Morse); Newton, Mass., bred from pupæ (F. C. Bowditch); Framingham, Mass., pupa, April 19, imago, May 12 (C. A. Frost); Lyme, Conn., pupa, April 30, imago, May 26 (A. B. Champlain); Darien, Conn., (♂, ♀) June 12; Newark, N. J., June 14 (C. W. J.) and Lehigh Gap, June 28 (C. T. Greene).

M. tristis was described from Virginia. I have specimens from Pennsylvania, New Jersey, Connecticut, and as far north as Great Barrington and Auburndale, Mass.

Microdon megalogaster Snow.

One specimen of this species was collected by the writer at Darien, Conn., June 12, and four specimens at Great Barrington, Mass., June 16; the latter were captured on or flying around an ant hill.

Sphærophoria.

The variations in the species of this genus are very difficult to define, while the great difference in the sexes also adds to the confusion. In the eastern United States and Canada there are apparently four species, which may be briefly tabulated as follows:

Table of Species.

1. Lateral thoracic stripe ending at the suture 2
   Lateral thoracic stripe continuous 3
2. Face entirely yellow, abdominal bands beyond the second segment present in the female, usually obsolete or wanting in the male, length 8 mm. . . . . *cylindrica* Say.
   Face with a wide black stripe, abdominal bands similar in both sexes, length 8 mm.. . . . . *novæangliæ* sp. nov.
3. Abdomen in the male with a series of yellow spots, in the female with widely interrupted bands narrowly connected with the lateral margin, length 8 mm. . . . . *strigata* Staeg.
   Abdomen with bands on the first four segments, the others irregularly marked with black, length 8-10 mm., *scripta Linn.*

Sphærophoria novæangliæ sp. nov.

S. cylindrica var. (*d*) Williston, Synopsis N. Amer. Syrphidæ, p. 105, 1886.

♂. Face and front pale yellow, a broad stripe extending from the mouth to the base of the antennæ, a small spot above the base of the antennæ and the vertex black, basal two-thirds of the proboscis black, the rest brown, antennæ yellow, upper edge of the third joint and arista brown. Thorax dark greenish black, shiny, the yellow lateral stripe extending only to the suture, pleura black, a small spot above the front and middle coxæ and a large spot in front and behind the base of the wing and the scutellum pale yellow, hairs of the latter black. Abdomen black, the broad yellow band on the second segment slightly wider at the middle becoming gradually narrower towards the lateral margins, band on the third segment double the width in the middle as at the lateral margins, fourth segment with only a wide dorsal triangle, the lateral extensions being either very narrow, obsolete, or wanting, the fourth and fifth segments shiny, with the margins strongly tinged with reddish brown, all of the segments having a very narrow lateral margin of yellow, genitalia reddish, venter yellow, legs yellow, coxæ livid or slightly marked with brown, front and middle femora with a small spot above near the base and tarsi brown, posterior femora with a subapical and the tibiæ with an apical band of black, with the entire tarsi also black. Halteres yellow. Wings hyaline slightly tinged with brown, stigma yellow. Length, 7.5 mm.

♀. Front yellow, with a wide black stripe about one third its width extending from the black of the vertex to the base of the antennæ, face and thorax as in the male. Abdomen bluish black, shiny, the broad, even bands of the second, third and fourth segments narrowly margined with opaque black, fifth with lateral spots and the narrow posterior margins of both the fourth and fifth segments yellow. Legs including the coxæ pale yellow, the tip of the posterior tibiæ and all of the tarsi blackish. Length, 7 mm.

Fourteen specimens. Holotype, Princeton, Me., July 12, 1909. Allotype, Shackford Head, near Eastport, Me., July 16. Eight paratypes, Princeton, Eastport, Machias (July 19), and Capens, Moosehead Lake, Me., July 17, 1907. Hanover, July 5, 1908; Bretton Woods, June 25, 1913, and Chester, Mass., May 26, in the collection of the Boston Society of Natural History. Two paratypes, Eastport (♂), Bretton Woods (♀), in the Museum of Comparative Zoölogy, and two from Capens, Me., and Bretton Woods, N. H., in the author's collection.

The species is readily distinguished by its black facial stripe. In some specimens the fifth, fourth and part of the third abdominal segments are somewhat reddish.

Sphærophoria strigata Stæger.

This species is common in Labrador and Newfoundland. In New England it has only been collected at Hampton, N. H., May 20, 1907, by Mr. S. A. Shaw.

Melanostoma.

The species of the *mellinum* group of the genus Melanostoma are even more difficult to separate than the species of the genus Sphærophoria. This is due not only to a still greater diversity in the color markings of the sexes but to the similarity of the females of all the species of this group. That this trouble is not confined to America is apparent when we consult the works of European dipterists.

M. mellinum L. and *M. scalare* Fabr. have been united and again separated either as varieties or species. Verrall, in his work on the British Syrphidæ, gives a lengthy account of the synonomy and variation of the two forms, and says: "Both species are common and are soon recognized by collectors, but melanoid forms of the female are as common as in *M. mellinum* and become veritable stumbling blocks; the absence of eye-margins separate them from *Chilosia* while the pale antennæ and legs separate them from most all species of *Platychirus* and the absolutely blackish face from all species of *Syrphus*."

In the mélange I have been unable to recognize *M. scalare* in America. *M. mellinum* is found throughout the greater portion of the United States and Canada, a common and easily recognized species in most localities. In the material collected on Mt. Washington, N. H., however, this is not the case. Here there are three marked forms, the males of which are readily separated, but the females are often very difficult to distinguish. One of these has been referred to *M. angustatum* Will. by Coquillett in Mrs. Slosson's list (Ent. News, Nov. 1896, p. 263). The species was described by Dr. Williston from Washington in 1886 (Synop. N. Syrphidæ, p. 50). The Mt. Washington specimens are smaller (7 to 8 mm.) and the antennæ and legs are much darker than specimens from Seattle, Wash. A specimen from Hanover, N. H., and one from Mt. Equinox, Vt., resemble more closely in this respect the western form. The second form is common at an elevation of from 2,000 to 4,000 feet, often associated with M. *angustatum*, and may be characterized as follows:

Melanostoma montivagum sp. nov.

♂. Face shining blue-black, front bronze, antennæ black, base of the third joint slightly reddish. Thorax greenish-black shining. Abdomen black, shining, second segment with two small, obscure, yellowish spots, third and fourth segments with dull yellow subquadrate spots. Legs black, the tips of the anterior and middle femora and bases of the tibiæ yellowish, the remainder of the tibiæ and the tarsi brownish. Wings infuscated. Length, 7 mm.

♀. A specimen taken at the same time and place as the male described above has the front and middle legs brown with the tips of the femora and bases of the tibiæ yellow, posterior legs black with the bases of the femora and tibiæ yellow, the yellow of the antennæ covering a large portion of the third and part of the second joint, the spots on the second segment of the abdomen very small, those on the second and third dull yellow and the triangular outline poorly defined. Wings equally dark as the male but this does not hold true in all of the specimens referable to this form.

Twenty-two specimens. Holotype and allotype, Halfway House (4,000 feet), Mt. Washington, July 6, 1914. Specimens were also collected near the Glen House, on the carriage road at about 3,000 feet, and in Tuckerman's Ravine. A specimen was also taken by Mrs. Slosson at the summit. The latter specimen was in the U. S. National Museum and was kindly loaned to me by Mr. F. Knab. It was marked "*Melanostoma* n. sp." in Mr. Coquillett's handwriting. Types and ten paratypes in the collection of the Boston Society of Natural History. Other paratypes in the Museum of Comparative Zoölogy, U. S. National Museum, Academy of Natural Sciences, and the author's collection.

Two of the paratypes (♂, ♀) in the Society's collection are melanic or without abdominal spots. The specimens from the Glen House referable to *M. mellinum* are slightly smaller with wings and legs somewhat darker than in the typical form. They seem somewhat intermediate in character, but I have not sufficient material to prove this; whether these mountain forms will prove to be only extreme variations or subspecies of the common *mellinum* remains to be seen. In any event names are necessary to avoid confusion.

A female specimen, a shiny, dark blue form, was also found at the Halfway House, July 6, 1914. With the limited material, I cannot separate it from *Melanostoma concinnum* Snow.

Merodon equestris Fabr.

Specimens of this species from both eastern and western Massachusetts would seem to indicate that the species was established, and not the result of recent importations of bulbs. A specimen from Blue Hill, June 5, 1910, represents the var. *narcissi* Fabr., a specimen from Mr. J. G. Jack, the var. *transversalis* Meig. and one collected by the writer near Great Barrington, Mass., June 16, 1915, the typical *equestris*.

Xylota nemorum Fabr.

This species has been taken by the writer at Chester, Mass., August 4, 1911, and at the Halfway House, Mt. Washington, N. H., July 6, 1914.

Eumerus strigatus Fallen.

This species has recently been taken by Mr. R. T. Webber, at Melrose Highlands, Mass.

Syrphus xylotoides sp. nov.

♀. Face yellow, covered with a white pollen which extends as a wide margin on each side of the front to the vertex, leaving wide frontal stripe of shining black, vertex facial stripe, and a stripe on the cheek also black, hairs on the front and vertex black, on the face and occiput white, eyes hairy, antennæ black. Thorax bluish, shining, slightly pollinose, with a large white pollinose marking on the sides in front of the suture, pleura whitish pollinose with long white hairs, scutellum shining blue-black, margin yellowish. Abdomen long, narrow, cylindrical, black, two large light yellow quadrate spots occupy most of the second segment leaving only a narrow dorsal line and a wide posterior margin, third segment with two yellow spots near the base, fourth and fifth segments greenish, shining, the former with two small grayish pollinose spots near the base. Legs, the front and middle yellow, base of the femora and a band on the tibiæ and tarsi blackish, the posterior legs except the base of the tibiæ black. Halteres yellow. Wings grayish hyaline. Length, 11 mm.

Three specimens. Holotype and paratype, Great Barrington, Mass., June 16, 1915, in the collection of the Boston Society of Natural History. One paratype, Amherst, Mass., in the collection of the State Agricultural College.

PARASITES OF ARCHIPS CERASIVORANA FITCH.

While collecting at Bennington, Vt., from June 18–24, 1915, I found the webs of the Cherry-tree Ugly-nest Tortricid (*Archips cerasivorana*) quite abundant on the wild cherry along the hedge rows. Bringing home six of the nests to ascertain to what extent they were parasitized, the following insects emerged between July 6 and 12. Moths 302. Dipterous parasites: *Dichætoneura leucoptera* Johns. 104 and *Neopales tortricis* Coq. 2. Hymenopterous parasites: *Bassus agilis* Cress. 6, and *Labrorychus prismaticus* Nort. 26. The latter was also bred in considerable numbers from the same species at Winchendon, Mass., by the late Dr. F. W. Russell. *Itoplectis* (*Pimpla*) *conquisitor* Say. was bred from nests taken by the writer at Milford, N. H., July 5, 1914. I am indebted to Mr. H. L. Viereck for the determination of the Hymenopterous parasites.

C. W. Johnson.

A NEW ANT OF THE GENUS MESSOR FROM COLORADO.

By Hazel Andrews,
University of Colorado, Boulder, Colo.

A few years ago Prof. T. D. A. Cockerell collected four workers of this ant at Glenwood Springs, Colo., not noticing at the time that they were anything unusual. Recently, while working on the genera *Messor*, *Aphænogaster*, and *Pogonomyrmex*, we found these specimens mixed with the series of *Pogonomyrmex occidentalis* which they superficially resemble. It was evident that they could not belong to *Pogonomyrmex*, on account of the impressed dorsal suture and other characters, and on looking up the literature we failed to find any similar species described. Dr. W. M. Wheeler, who kindly examined a specimen confirms the species as new, and considers that it must be referred to *Messor* rather than *Aphænogaster*. He further notes that it presents some characters suggesting that it may, in a certain sense, be regarded as intermediate between *Messor* and *Pogonomyrmex*.

Messor lobognathus sp. nov.

Worker: Length, about 6 mm. Head quadrate, about as wide as long, excluding mandibles. Posterior corners of head rounded, vertex almost straight, sides almost straight and parallel. Surface of head with sparse hairs, rugose, with rugæ posteriorly divergent; interrugal spaces distinctly reticulate. Clypeus very short with rugose surface, ridges irregular; shallowly emarginate anteriorly. Mandibles stout and convex, peculiarly lobed apically, with two large apical teeth and five to seven rudimentary teeth; surface coarsely striated. Eyes moderate, at sides of head, about half way between clypeus and vertex. Antennæ 12-jointed, hairy; scape compressed and dilated at base, hardly extending beyond corners of head; last four joints of funiculus incrassate, but hardly forming a distinct club. First joint longer than second, but not twice as long. Pronounced beard of recurved hairs, as in *Pogonomyrmex*. Thorax slender, irregularly rugose, sparsely clothed dorsally with long, glistening, light yellow hairs. Pro- and meso-notum convex. Thoracic dorsum deeply impressed at mesoepinotal suture; mesoepinotal suture distinct. Spines of epinotum acute, much longer than broad at base; divergent; striations radiating from the base; infraspinal cavity smooth. Petiole punctate with a few hairs; longer than wide; ventral surface straight in profile; a high posteriorly placed superior node; apex broader than base; posterior slope abrupt; anterior slope long and gentle. Postpetiole narrow at base, a little longer than wide when seen in profile; superiorly convex and sides rounded. Thus the postpetiole is globose. Gaster shining, scarcely larger than head, with delicate microscopic reticulate sculpture on apical part of segments. Sting vestigial. Legs quite long; posterior tibial spurs spinulose.

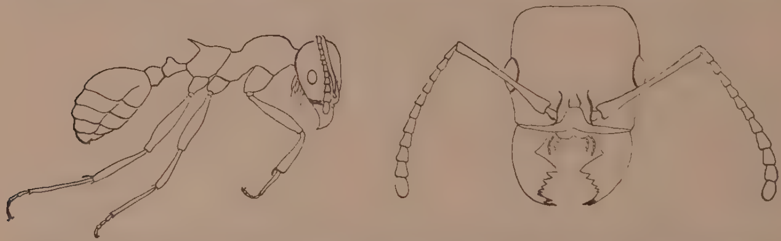


Fig. 1. *Messor lobognathus* sp. nov. Lateral view and anterior view of head.

Bright rufo-fulvous; tip of gaster light brown; clypeus, funiculus, clypeus and borders of mandibles brown.

Glenwood Springs, Colo., altitude 5,750 feet (Cockerell).

Superficially the ant resembles *Pogonomyrmex occidentalis* Cresson, but, as noted by Dr. Wheeler, the impressed thorax, shape of petiole, vestigial sting and non-pectinated posterior tibial spurs put it in the genus *Messor*. From the shape of the mandibles the ant evidently stores seeds. This ant differs from the other species of Messor in the fulvous red color and in having the peculiar apical lobe on the mandibles. The antennal scapes are more dilated at the base than in other species.

A COMPARATIVE STUDY OF THE MAXILLÆ OF THE ACRIDIIDÆ (ŒDIPODINÆ AND TETTIGINÆ), PHASMIDÆ AND PHYLLIIDÆ.[1]

By G. C. Crampton.

In attempting to determine the phylogeny and relationships of the Orthoptera-like insects, it has seemed advisable to make a comparative study of the various parts of the head (*i. e.*, the trophi, antennæ, etc.), of the thorax (*i. e.*, the sclerites, appendages, etc.), and of the abdomen (*i. e.*, the cerci, genitalia, etc.); and the present paper dealing with four of the types of maxillæ found in the Orthopteroid forms is offered as one of a series in which the trophi of these insects are discussed, in addition to the various other structures mentioned above. Since no detailed descriptions or figures of the maxillæ of the Phylliidæ, Phasmidæ, and Tettiginæ have been published (so far as I am aware), and since the general scheme of the maxillary structure is practically the same in all Orthopteroid insects, it has seemed preferable to begin the series of articles on the trophi, etc., of the Orthoptera-like forms, with the description of the maxillæ of the above mentioned insects.

The accompanying figures of the maxillæ are necessarily somewhat diagrammatic, since certain structures shown in the figures (*e. g.*, the basal portions of the cardo, etc.) would not be completely visible if sketched from the angle at which the remainder of the figure is drawn. Furthermore, lack of material preserved in alcohol has made it necessary to draw the figures from dried specimens—which are always more or less distorted. In the main, however, it will be found that the relations of the parts are represented approximately correctly. Since the specimens were studied from various angles, it was found necessary to examine them submerged in a liquid medium (rather than mounted on slides) and a binocular was found much more satisfactory than the compound microscope, for this purpose.

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[1] Contribution from the Entomological Laboratory of the Massachusetts Agricultural College, Amherst, Mass.

In all of the figures, the insect's left maxilla has been depicted, and all views represent that surface of the maxilla which is normally directed posteriorly when the maxilla is "*in situ*"—or attached to the insect's head.

In Fig. 1 (Plate XI) is shown the maxilla of a species of the Phasmid *Anisomorpha* (probably *Anisomorpha buprestoides*), while that shown in Fig. 2 is of a species of Phyllium (probably *Phyllium scythe*). Fig. 4 is based upon the condition found in the maxilla of *Tettigidea parvipennis*, and that of a species of *Paratettix*. Fig. 3 represents the maxilla of *Dissosteira carolina*, and in this figure the outline of the distal segment of the galea is somewhat distorted, due to the fact that the specimen was flattened out to a greater extent than in the other insects figured.

As may be seen from the accompanying figures, the *cardo*, or basal portion of the maxilla (*co*, of all figures) is divided into two subdivisions in the Orthoptera-like insects. These two subdivisions are the *veracardo* (*vc*) and the *juxtacardo* (*jc*). The basal portion of the juxtacardo, *jc*, is not clearly visible until the maxilla is turned base upward, at a considerable angle. This region of the juxtacardo bears a prominent articulatory condyle, *ac*, to which there is usually attached a slender chitinous "muscle tendon." This maxillary condyle tendon is not shown in Figs. 1 and 2, but is colored black in Figs. 3 and 4. The juxtacardo of Phyllium and the Phasmids (Figs. 1 and 2, *jc*) is much broader in comparison with the veracardo (*vc*) than is the juxtacardo of the Acrididæ here figured.

The *stipes* (*st*, of all figures), like the cardo, is also divided into two principal subdivisions, the *juxtastipes* (*js*) and *verastipes* (*vs*),[1] which correspond in a general way to the two subdivisions of the cardo. The juxtastipes of Phyllium (Fig. 2, *js*) is much broader than in the other insects here figured, and the verastipes (*vs*) is divided into an upper and lower region in this insect. The lower region (*pf*) corresponds in a general way to the palpifer of the other insects, but is not strictly homologous with the palpifer.

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[1] The designations eucardo, eustipes, paracardo and parastipes would be somewhat briefer and more euphonious than veracardo, verastipes, juxtacardo and juxtastipes; but, since cardo and stipes are Latin terms, it is preferable to combine them with "vera" and "juxta" rather than with the Greek "eu" and "para."

A comparison of the maxillæ of certain immature Plecoptera, Ephemerida, and of certain Thysanura, with the first and second maxillæ of such centipedes as *Scutigera* and *Scolopendra*, would indicate that the maxillæ of an insect is compound, and probably represents a combination of the first and second maxillæ of *Scutigera*, etc. I am not yet prepared to say, however, that the line of demarcation between the juxtacardo and veracardo, which is continued upward between the juxtastipes and verastipes, represents the line of union of the basal portions of the two components of an insect's maxilla—although the possibility of such a condition would bear further investigation.

The *palpifer* (*pf*) or palpus-bearing sclerite, is rather indistinctly demarked in the insects under consideration. It is practically always bent backward, or folded around to the other side in such a fashion that the palpus (*pp*) is borne on the surface of the maxilla opposite to the one shown in the drawings.

The *palpus* (*pp*) is composed of five segments, and, in the insects under discussion, the two basal segments are subequal in size, but are much shorter than the three terminal ones. The three terminal segments of the palpus may be subequal in size, or the intermediate one may be shorter than the other two.

The segments of the maxillary palpus of *Phyllium* (Fig. 2, *pp*) are much flattened, or depressed, in conformity with the general flattened condition of the entire body of this insect. The two distalmost segments of the palpus of the Tettiginæ (Fig. 4, *pp*) are also considerably flattened, but this is apparent only after turning the palpus around to a much greater angle than that at which the remainder of the figure was drawn. The end segment of the palpus of *Dissosteira* (Fig. 3) bears a well marked terminal sensory area demarked by a dotted line in the drawing. This area is well provided with sensory setæ whose chief function is doubtless gustatory.

The *galea*, or external lobe of the maxilla, is composed of two segments—the *basigalea* (*bg*) or proximal segment being much shorter, and less distinctly demarked, than the *distigalea* (*dg*) or distal one. The distigalea may overtop the inner maxillary lobe, or lacinia (*la*), as is the case in three of the insects here figured (Figs. 1, 2 and 3), and this condition is characteristic of most of the insects related to the phasmids. The Tettiginæ, however (Fig. 4), seem to be an exception to the rule, and in this respect resemble certain Gryllidæ.

The distal segment of the galea (distigalea) of the Phasmids bears a well developed lobular process, the *galealobulus* (Fig. 1, *gl*) which may be homologous with the basal lobe of the bilobed galea of certain Hymenoptera. The lobule is poorly developed in Phyllium (Fig. 2, *gl*) and is absent in the Acrididæ here figured.

The *lacinia* (*la*) or inner maxillary lobe is more nearly vertical in outline in the Tettiginæ, Phylliidæ, and Phasmidæ (Figs. 4, 2, and 1), while in *Dissosteira* (Fig. 3) the inner margin of the lacinia sweeps downward in a broad curve to the projecting inner basal angle, thereby making the lacinia of this insect much broader at the base than is the case with the other insects under discussion. The inner basal angle of the lacinia of the Phylliidæ and Phasmidæ (Figs. 2 and 1) is much more protuberant than in the maxilla of the Tettiginæ (Fig. 4), although in the latter insects also a projecting basal portion is to be seen if the maxilla is turned much further around than in the view shown in the drawing. In *Dissosteira*, the surface of the inner basal angle of the lacinia is densely beset with rounded microscopic scales.

Along the inner margin of the distal portion of the lacinia, there occur several tooth-like projections, or *laciniadentes*. The function of these "teeth" is apparently that of holding, and possibly of assisting in comminuting the food. In the insects related to the Phasmids, these laciniadentes are arranged in two rows, or are separated by a vertical groove into two sets, although there is usually but one terminal "tooth."

The principal conclusions here reached, concerning the maxillæ of the Acridiidæ, Phylliidæ and Phasmidæ, may be briefly summarized as follows:

The cardo is composed of two subdivisions, the juxtacardo and veracardo.

The stipes is composed of two principal subdivisions, the juxtastipes and verastipes.

Fig. 1

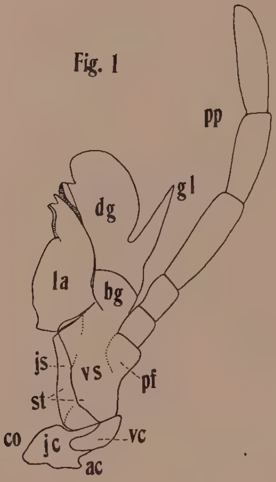


Fig. 2

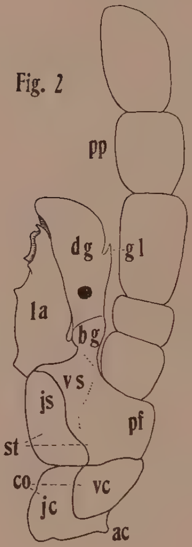


Fig. 3

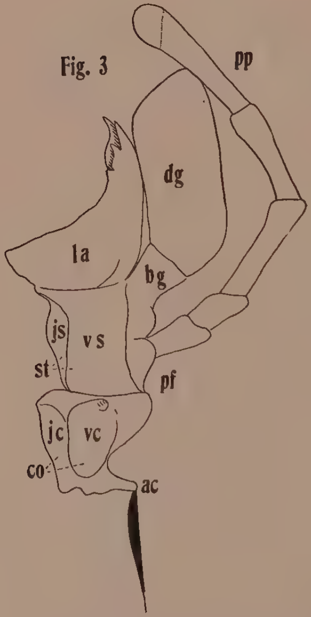
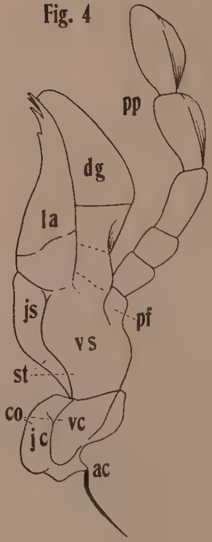


Fig. 4



CRAMPTON—*Maxillæ of Orthoptera*

The basal two of the five segments of the palpus are subequal, and are much shorter than the three distal ones, which are usually subequal in length.

All of the segments of the palpus are greatly flattened in the Phylliidæ, while in the Tettiginæ, the distal two are somewhat flattened.

The galea is composed of two segments, and the distal one overtops the lacinia, save in the Tettiginæ.

The distal segment of the galea of the Phasmidæ bears a well developed lobular process (galealobulus) which may represent the basal lobe of the bilobed galea of certain Hymenoptera. It is but feebly developed in the Phylliidæ, and is absent in the Acridiidæ.

The tooth-like processes of the lacinia (laciniadentes) occur in two rows, thus differing from those of many other Orthopteroid insects in which they occur in a single row.

The maxilla of the Phylliidæ resembles that of the Phasmidæ rather more than it resembles that of the Acridiidæ.

The maxilla of an insect is possibly compound, and may represent the combined first and second maxillæ of *Scutigera*, and other centipedes.

EXPLANATION OF PLATE XI.

Fig. 1. Posterior view of the left maxilla of a Phasmid.
Fig. 2. Posterior view of the left maxilla of *Phyllium*.
Fig. 3. Posterior view of the left maxilla of *Dissosteira*.
Fig. 4. Posterior view of the left maxilla of a Tettigid.

ABBREVIATIONS.

ac = articulatory condyle of cardo.
bg = basal segment of galea (basigalea).
co = cardo.
dg = distal segment of galea (distigalea).
gl = lobular process of galea (galealobulus).
jc = proximal subdivision of cardo (juxtacardo).
js = lesser subdivision of stipes (juxtastipes).
la = lacinia.
pf = palpifer.
pp = maxillary palpus.
st = stipes.
vc = distal subdivision of cardo (veracardo).
vs = principal subdivision of stipes (verastipes).

TABLE OF MALES OF THE NORTH AMERICAN SPECIES OF THE GENUS ASYNDETUS WITH DESCRIPTIONS OF SIX NEW SPECIES.

By M. C. Van Duzee.
Buffalo, New York.

This little genus is distinguished from Diaphorus by the latter part of the fourth vein being evanescent, and the costa ending at the tip of the third vein. The males of most of the species have conspicuous bristles at the tip of the abdomen as in Diaphorus.

The species described below are mostly from the western states where it is likely many new forms will yet be found.

Table of Males.

1\. All tibiæ partly or wholly yellow 2
   Hind tibiæ black 5
2\. Fore tarsi modified, hind tibiæ blackened at base 3
   Fore tarsi normal, hind tibiæ blackened at tip 4
3\. First joint of fore tarsi incrassated . . . . *ammophilus* Loew.
   Second joint of fore tarsi with clavate, halter-like, yellow appendages . . . . *appendiculatus* Loew.
4\. Front and face very wide and covered with silvery pollen, palpi black (Fig. 4) . . . . *latus* sp. nov.
   Ground color of front and face showing through the white pollen; palpi rather large, white (Fig. 5) . . . . *caudatus* sp. nov.
5\. Fore and middle tibiæ black or brown 6
   Fore tibiæ yellowish, sometimes the middle ones also 8
6\. Third antennal joint small, rounded, not longer than wide. 7
   Third antennal joint large, twice as long as wide (Fig. 3) *nigripes* sp. nov.
7\. Mesonotum with a brown-dusted median vitta between two bluish-gray ones, length 2.5 mm . . . . *fratellus* Ald.
   Mesonotum not vittate . . . . *interruptus* Loew.
8\. Third antennal joint somewhat quadrilateral in outline 10
   Third antennal joint rounded below and with a point at tip . . 9
9\. Third antennal joint nearly straight above, fore tibiæ with short hair and very small scattering bristles (Fig. 2) *texanus* sp. nov.

Third antennal joint notched on the upper side, the arista inserted just above and before this notch; fore tibiæ with a row of rather long slender bristles the whole length (Fig. 6) *johnsoni* sp. nov.

10. Fore tibiæ with long bristle-like hairs on the whole upper surface; third antennal joint twice as long as wide; second joint extending to near the middle of the third above, at which point the third is attached 11

Fore tibiæ with only short hairs; third antennal joint but little longer than wide (Fig. 1) .... *cornutus* sp. nov.

11. Second antennal joint ending in sharp point at tip of which the third joint is attached; upper edge of third joint concave *harbeckii* VanDuzee

Second joint ending in a rounded projection near the middle of the third joint; third joint nearly straight above *syntormoides* Wheeler

Asyndetus cornutus sp. nov.

Male: Length, 2–2.2 mm. Face wide, covered with white pollen which extends a little above the base of the antennæ; front wider than the face, green, shining; orbital cilia pale below with a few longer hairs near the oral margin; antennæ (Fig. 1) black, third joint somewhat lozenge-shaped with a rounded point at the upper corner, a little longer than wide, arista inserted on the upper edge near the base of the third joint. Thorax green, shining, with only slight traces of pollen; pleuræ more black. Abdomen green, becoming more coppery toward the tip, bristles at tip very small; hypopygium concealed. Coxæ and femora black; fore and middle tibiæ yellowish, but sometimes rather dark, with short hairs and without or with scarcely perceptible bristles; hind tibiæ and tarsi and fore and middle tarsi from the tip of the first joint black. Tegulæ, their cilia and

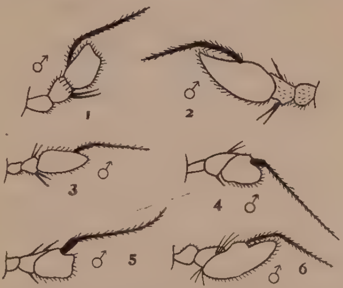


Fig. 1. Antennæ of Asyndetus. 1, *A. cornutus*, sp. nov.; 2, *A. texanus* sp. nov.; 3, *A. nigripes* sp. nov.; 4, *A. latus* sp. nov.; 5, *A. candatus* sp, nov.; 6, *A. johnsoni* sp. nov.

the knob of the halteres whitish. Wings grayish hyaline; fourth vein with the thin outer section bent back so as to reach the wing margin a little back of the apex of the wing.

Female: Agrees with the male very closely except that the third antennal joint is small and rounded and the general color is more golden or coppery.

Described from three males and five females taken at Saltair, Great Salt Lake, Utah, June 8; and two males and one female from Carriso Creek, San Diego Co., California. Type in the author's collection.

Easily distinguished from *syntormoides* Wheeler by the third antennal joint being shorter and the hair of the fore tibiæ being very short, while in Wheeler's species it is very long and conspicuous. From *texanus* sp. nov. it is separated by the third antennal joint being more angulated below near the tip, while in *texanus* it is evenly rounded below.

Asyndetus texanus sp. nov.

Male: Length, 2–2.8 mm. Face short, green with thin white pollen; front wider than the face, green, shining, without pollen except just above the antennæ; antennæ black, third joint more brownish, large, twice as long as wide, rounded below, nearly straight above (Fig. 2); arista inserted near the middle above. Thorax green, shining. Abdomen somewhat more coppery, incisures blackish; hypopygium small, imbedded, without visable appendages, the bristles at tip stout but short. Coxæ and femora black, shining, with slight green reflections; fore and middle tibiæ dark yellowish, with short hair; fore tibiæ with a few scattering bristles above; middle tibiæ with two bristles, one at first and one at second third; hind tibiæ black, shining; fore and middle tarsi about as long as their tibiæ, blackened towards their tips; hind tarsi black, shorter than their tibiæ. Tegulæ, their cilia and the halteres yellow. Wings grayish hyaline; third vein nearly straight; fourth vein delicate, gently bent, ending just back of the apex of the wing.

Female: Agrees with the male in color, venation, and bristles of the legs. Third antennal joint small, scarcely as long as wide, rounded at tip.

Described from six males and five females taken at Galveston, Texas, May, by F. H. Snow; and Bill Williams Fork, Arizona, August. Type in the Kansas University collection.

One of the males from Arizona is steel-blue and the bristles of the fore tibiæ are scarcely visable.

This species is very much like *snytormoides* Wheeler, but is smaller, the third joint of the antennæ are more rounded below and smaller, and the fore feet are less hairy.

Asyndetus nigripes sp. nov.

Male: Length, 3.2 mm. Face and front green; face with thin white pollen and narrower than the front; palpi brown; proboscis black; antennæ (Fig. 3) black, third joint more brownish, rather large, about twice as long as wide, pointed, somewhat conical in outline; arista dorsal; lateral and inferior orbital cilia pale ending in a few longer hairs on each side of the oral opening. Thorax dark green, shining, with but little pollen; base of abdomen green, the last three segments more coppery, there are several bristles extending somewhat upward and backward in the described specimen (their position may not be natural). Coxæ and legs black; femora with green reflections; pulvilli scarcely enlarged, white; all tarsi about the length of their tibiæ. Tegulæ, their cilia and the halteres pale yellow. Wings grayish hyaline; veins black; costa stout as far as the tip of the third vein where it ends; third vein nearly parallel with the second vein, ending far before the tip of the wing; the delicate fourth vein with only a slight bend, ending just back of the apex of the wing; cross-vein close to the root of the wing.

Female: Agrees with the male in general characters, but the third antennal joint is small, scarcely as long as wide, rounded at tip.

Described from one male and one female taken at Springdale, Los Angeles Co., Cal., April 29, on a rose bush; and a female from San Diego, Cal., May 1.

Asyndetus latus sp. nov.

Male: Length, 3.5 mm. Face and front thickly covered with silvery pollen so as to conceal the ground color, very wide and with parallel sides; palpi and proboscis black, the former with stiff black bristles; antennæ (Fig. 4) black, third joint small, taken with the second rounded in outline; arista dorsal, its first joint short, second long and slender, scarcely pubescent; lateral and inferior orbital cilia white. Thorax and abdomen blue green; pleuræ and thorax with white pollen, which is thickest on the former; abdomen with the pollen thinner, when viewed obliquely with a central line and the incisures black; hypopygium small, bronze-green with several stout bristles at tip, its appendages scarcely visable. Coxæ and femora blue-green with white pollen; trochanters and tips of femora yellow; all tibiæ pale yellow; hind tibiæ with their tips black for a distance about equal to the length of their metatarsi, fore tarsi blackened from the second joint and middle tarsi from the tip of the first joint; fore and middle tarsi about one and a fourth times as long as their tibiæ; hind tarsi three fourths as long as their tibiæ and wholly black; fore and middle tibiæ with very short hairs and no bristles except one near the basal third of middle pair; hind tibiæ with slender bristles above; fore pulvilli not enlarged. Tegulæ, their cilia and the halteres pale yellow. Wings grayish hyaline; veins dark brown, yellowish at the root of the wings; costa rather stout from the tip of the first vein to the third where it ends; third vein runs nearly straight and parallel to the second until opposite the tip of that vein where it bends a little backward reaching the costa about half way from that point to the tip of the wing; the slender fourth vein bent forward then backward near its third fourth, ending back of the apex of the wing.

Described from one male taken at Bill Williams Fork, Ariz., in August, by F. H. Snow. Type in the collection of the University of Kansas.

Since writing the above I have found among my material taken at Carriso Creek, San Diego Co., Cal., two females which no doubt belong to the same species as the male described above.

Asyndetus caudatus sp nov.

Male: Length, 2.2 mm. Face and front green, covered with white pollen which nearly conceals the ground color of the former; face a little narrower than the front but rather wide; palpi rather large, white; proboscis yellowish; antennæ (Fig. 5) black, third joint small rounded; arista dorsal; lateral and inferior orbital cilia white. Thorax and abdomen dark but bright green with but little pollen; hypopygium small, produced forward below into a short point and with several stout bristles at tip. Coxæ and femora black with green reflections; tips of coxæ, trochanters and base of femora yellow; tibiæ yellow, the tips of the hind pair brown; fore and middle tarsi about one and one fourth times as long as their tibiæ, infuscated from the tip of the first joint; hind tarsi black, shorter than their tibiæ; fore and middle tibiæ without bristles except a very slender one at basal third of middle pair; hind tibiæ with a few very small bristles. Tegulæ, their cilia and the halteres pale yellow. Wings hyaline, slightly tinged with gray; third vein nearly straight, parallel with the second, its tip far before the tip of the wing; the delicate fourth vein broken, its last portion somewhat forward of the basal part, but in a nearly parallel line with it, ending in the apex of the wing.

Described from one male from Bill Williams Fork, Ariz., taken in August, by F. H. Snow. Type in the Kansas University collection.

This can be separated from *latus* n. sp. by its smaller size narrower face and front, white palpi and straight third vein.

Asyndetus johnsoni sp. nov.

Male: Length, 2 mm. Face and front green, the latter only slightly wider than the former; lower orbital cilia white and rather short; antennæ (Fig. 6) black, third joint large, rounded below but irregular in outline above. Thorax and scutellum dark shining green. Abdomen bronze green, towards the apex nearly black; hypopygium black; bristles at apex of abdomen distinct but rather slender. Coxæ black; femora brownish black with a row of slender hairs below; fore and middle tibiæ yellow; fore tibiæ with a row of hair-like bristles extending the whole length above, these bristles about as long as the thickness of the tibiæ; middle tibiæ with three bristles on the upper front edge; hind tibiæ brownish black with a number of small bristles above; fore and middle tarsi about as long as their tibiæ, infuscated from the tip of the first joint; hind tarsi brown, scarcely as long as their tibiæ, with rather conspicuous hair. Tegulæ, their cilia and the halteres yellow. Wings grayish hyaline; fourth vein bent backward but not distinctly broken at about the middle of the last section, ending back of the apex of the wing; cross-vein a little nearer the base of the wing than the tip of the first vein is.

Female: Third antennal joint smaller than in the male with a nearly basal arista. Abdomen green, its insisures black with coppery reflections, in certain lights with a longitudinal black line in the center on the dorsum. Femora shining green; I cannot see the row of bristles on the fore tibiæ which appear in the male; fore and middle tibiæ yellowish, darker at base; hind tibiæ brownish black; fore and middle tarsi black from the tip of the second joint; hind tarsi black.

Described from one male and one female taken at Rowayton, Conn., August 4, by C. W. Johnson.

Type in the collection of the Boston Society of Natural History. This is very much like *A. texanus* sp. nov. but has the third antennal joint irregular in outline above, the fore tibiæ has a row of hairs or bristles above and the lower orbital cilia is distinctly shorter, especially near the proboscis.

CORA H. CLARKE.

Cora Huidekoper Clarke, the daughter of James Freeman and Anna Huidekoper Clarke, was born February 9, 1851, in Meadville, Pa., the home of her mother's family. From 1854 to 1897 she lived with her parents in Jamaica Plain, a suburb of Boston. After their deaths she moved to Mt. Vernon Street, Boston, where she remained until her own death April 2, 1916. Her summers were passed at a family seashore place in Manchester, Mass. Occasionally this was varied by a visit to Meadville or a trip abroad.

As a child, her health was delicate and for that reason she did not go to school until about thirteen years old, but during her school years, by diligence and conscientious study, she held her place with girls of her own age. When eighteen years old, she went to a horticultural school in Newton. She next studied at the Bussey Institution in Jamaica Plain and there enjoyed the advantage of having Francis Parkman as instructor. The class was small and sometimes she was the only pupil. Mr. Parkman perceived and appreciated her somewhat uncommon mental gifts and said to her father, "Your daughter has qualities of mind that most women do not possess."

She became a teacher in Miss Ticknor's Society for encouraging study at home and then and later her influence became a source of inspiration to many correspondents. Her own delight in these pursuits communicated itself to others. She founded a little club called The Science Club, which has maintained itself for many years, and was the leader of the Botany Group of the New England Women's Club. She was a member of several scientific societies, including the Cambridge Entomological Club and the Boston Society of Natural History, of which she was a member of the Council.

Miss Clarke was especially interested in botany and entomology and was known to entomologists by her interesting papers on the larval cases of the caddis-flies, and by her remarkable success in rearing gall-flies. The gall-midges (Cecidomyiidæ) were sent to Dr. E. P. Felt and he has described over thirty species new to science that were reared by Miss Clarke mostly in the vicinity of Boston and Magnolia, Mass. Three of the species were named in her honor, the others usually bearing the name of the plants upon which she found the galls. She reared many Hymenopterous gall-flies (Cynipidæ), five new species were discovered and named by H. F. Bassett, two of which were dedicated to her. A number of the little gall making moths were also reared, two of the latter being new species, named by Mr. Augustus Busck.

Miss Clarke was a skillful photographer and made excellent photographs of the galls. Some of these were mounted and arranged in two volumes which she presented to the library of the Boston Society of Natural History. Volume 1, Hymenopterous galls, contains 66 photographs and Volume 2, Dipterous galls, etc., 102 photographs.

The following are some of Miss Clarke's writings:

Description of Two Interesting Houses made by Native Caddis-fly Larvæ. Proc. Boston Soc. Nat. Hist., Vol. 22, pp. 67–71, 1882.

Caddis Worms of Stony Brook, Psyche, Vol. 6, pp. 153–158, 1891. Galls Found Near Boston. Read before the Mass. Horticultural Society, Feb. 1, 1890. 11 pages.

New Missionary Work. *Jour. N. Y. Botanical Garden*, Vol. 3, pp. 62–69, 1902. Awarded the second prize of thirty dollars, competition of 1902, from the Caroline and Olivia Phelps Stokes Fund for the Preservation of Native Plants.

A suggestion for Summer Observation. *Rhodora*, Vol. 14, pp. 177–184, pl. 97–99, 1912.

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Wanted: Psyche, Vol. VIII, No. 265 (May, 1898); No. 267 (July, 1898); No. 268 (August, 1898); Vol. IX, No. 300 (April, 1901). Address, giving price, Librarian, Stanford University, Cal.

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